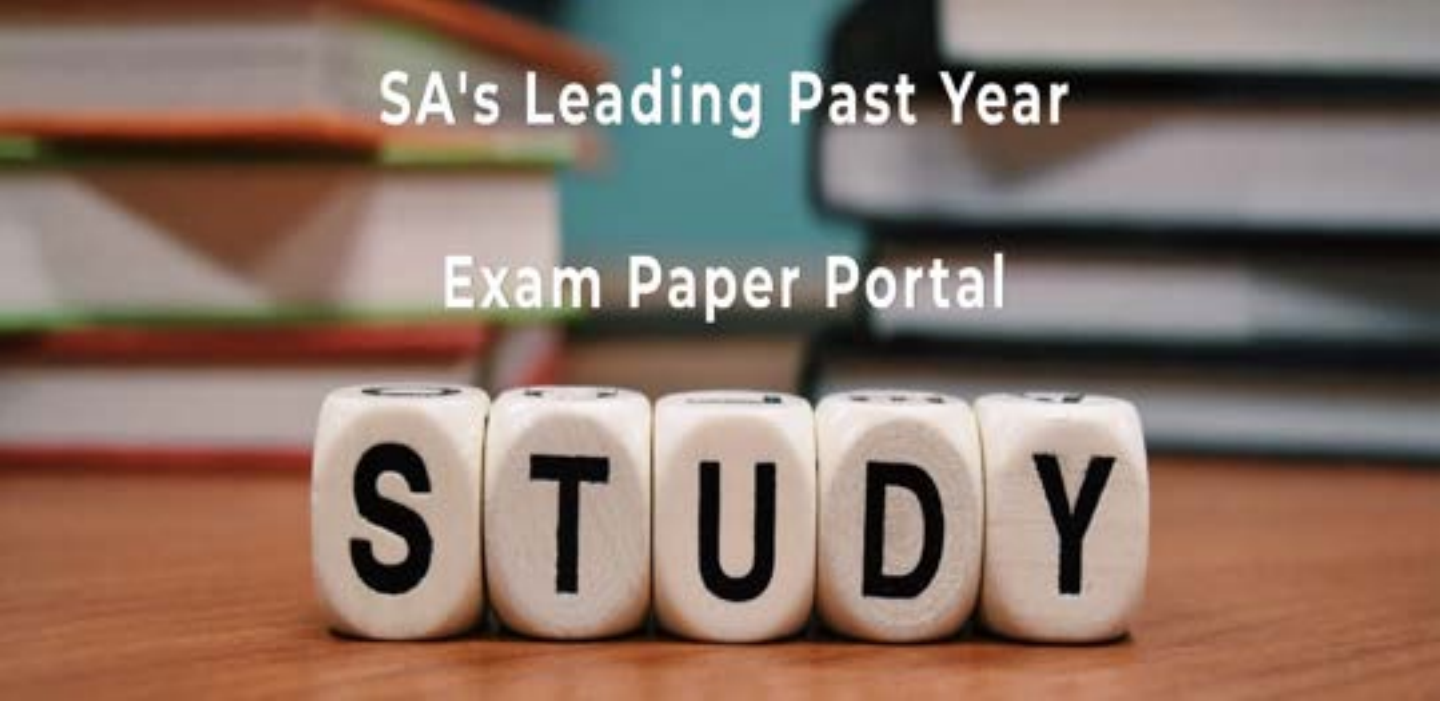

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AGRICULTURAL TECHNOLOGY

EXAMINATION GUIDELINES

GRADE 12

2021

These guidelines consist of 12 pages.

TABLE OF CONTENTS

1. INTRODUCTION

The *Curriculum and Assessment Policy Statement (CAPS)* for Agricultural Technology outlines the nature and purpose of the subject Agricultural Technology. This guides the philosophy underlying the teaching and assessment of the subject in Grade 12.

The purpose of these Examination Guidelines is to:

- Provide clarity on the depth and scope of the content to be assessed in the Grade 12 National Senior Certificate Examination in Agricultural Technology.
- Assist teachers to adequately prepare learners for the examinations.

This document deals with the final Grade 12 external examinations. It does not deal in any depth with the school-based assessment (SBA), practical assessment tasks (PATs) or final external practical examinations, as these are clarified in a separate PAT document which is updated annually.

These Examination Guidelines should be read in conjunction with:

- The *National Curriculum Statement (NCS) Curriculum and Assessment Policy Statement (CAPS)*: *Agricultural Technology*
- The National Protocol of Assessment: *An addendum to the policy document, the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF), regarding the National Protocol for Assessment (Grades R–12)*
- The national policy pertaining to the programme and promotion requirements of the National Curriculum Statement, Grades R–12

2. ASSESSMENT IN GRADE 12

2.1 External Assessment in Grade 12

The external examination for Agricultural Technology in Grade 12 will consist of one paper that contains six questions and counts 200 marks. The duration of the paper will be 3 hours. All the questions are COMPULSORY.

The breakdown of questions is as follows:

QUESTIONS	CONCEPTS COVERED	MARKS
Q1	Multiple-choice questions can cover all content areas (10 x 2) One word/concept (5 x 2) Column A/Column B (5 x 2)	**20** **10** **10**
Q2	Structural materials and related drawings, measurements and safety	**35**
Q3	Electrical energy and related tools, materials and safety	**20**
Q4	Skills and construction processes and related tools, materials, drawings, measurements and safety	**35**
Q5	Tools, implements and equipment and related tools, materials, drawings, calibrations and safety	**40**
Q6	Irrigation and water supply. Related tools, materials, drawings and measurements and communication	**30**
	TOTAL	**200**

2.2 Cognitive levels

CATEGORIES OF COMPLEXITY	DESCRIPTION OF CATEGORIES	SOME EXAMPLES	WEIGHTING
Remembering	Recalling information	Recognising, listing, describing, retrieving, naming, finding, give labels and state or identify functions, processes, mechanisms, etc.	**± 40%**
Understanding and application	Using information in another familiar situation. Explain ideas or concepts.	Implementing, carrying out, using, executing, interpreting, summarising, paraphrasing, classifying and explaining processes, mechanisms; make direct deductions from data given; do calculations, interpreting data; explaining adaptations or environmental factors influencing effectiveness; draw flow charts or mind maps to illustrate processes or mechanisms; constructing tables and graphs to organise and present data; drawing sketches to investigate concepts; communicate findings and applying formulae	**± 40%**
Creating, evaluation and analysing	Generating new ideas. Justifying a decision or course of action. Breaking information into parts to explore understandings and relationships.	Designing, constructing, planning, producing, inventing, checking, hypothesising, critiquing, experimenting, judging, comparing, organising, deconstructing, interrogating and finding	**±20%**
TOTAL			**100%**

2.3 Programme of Assessment for Grade 12

The programme of assessment is designed to spread formal assessment tasks in all subjects in a school throughout a term.

<table>
<tr><th colspan="4">FORMAL ASSESSMENT: GRADE 12 (SIX TASKS)</th></tr>
<tr><th>TERM 1</th><th>TERM 2</th><th>TERM 3</th><th>CERTIFICATION MARK</th></tr>
<tr><td>1. Research task: 25%

2. Control test: 75%</td><td>3. June test: 100%</td><td>4. Trial examination: 100%</td><td>SBA: Internal
Term 1: 100
Term 2: 100
Term 3: 100
Total: 300/12 = 25%

5. PAT:
Design: 25
Construction process: 50
Final product: 25
Total: 100/4 = 25%

6. Final Examination: External
Total: 200/4 = 50%</td></tr>
<tr><td>100</td><td>100</td><td>100</td><td>Total Certification Mark: 100%</td></tr>
<tr><td colspan="3">• Internally set
• Internally assessed
• Externally moderated
• Recorded on computerised SBA mark sheets provided by the provincial assessment body</td><td>• PAT
• Internally set
• Internally assessed
• Externally moderated
• Recorded on computerised PAT mark sheets provided by the provincial assessment body

• November Examinations
• Externally set
• Externally assessed
• Externally moderated
• Externally recorded</td></tr>
</table>

EXAMPLES OF ASSESSMENT TASKS IN AGRICULTURAL TECHNOLOGY

Control Tests

- The control test in Agricultural Technology must be substantive in terms of time and marks.
- Minimum 75–100 marks with a duration of 2 hours
- Tests should include the theory of the technological process, principles and concepts and the application thereof in the production of product/artefact.

Research Task

- This task should be based on activities such as research, case study, projects, simulations, modelling, fabrication, manufacturing and demonstration and should focus on a variety of technological themes relating to an agricultural context.
- Minimum marks for the research task must be 100 marks.
- Tasks such as simulations put theoretical knowledge to practical use and usually do not require conclusions.
- Therefore, simulations will not include elaborate worksheets and conclusions but should rather generate guidelines and criteria to what is required.

Examples of Research Tasks: Grade 12

- Research on the maintenance of an electric fence
- Set up a small-scale solar panel system on the farm
- Research on a centre-pivot irrigation system

Trial Examinations

- The trial examinations for Grade 12 should consist of one paper of six questions and will count 200 marks.
- The suggested duration of the paper is 3 hours. ALL the questions are COMPULSORY.
- The trial examination needs to be closely related to the final examination in terms of time allocation, layout of the paper and subject requirements.

External assessment in Grade 12

The external assessment task in Grade 12 consists of an externally written paper (50%) and a PAT (25%).

November External Examination NSS

- The external examination for Grade 12 will consist of one paper that contains six questions and counts 200 marks.
- The duration of the paper will be 3 hours. ALL the questions are COMPULSORY.
- The examination papers should test the knowledge and skills covered in Agricultural Technology.

EXAMINATION GUIDELINES FOR AGRICULTURAL TECHNOLOGY
General remarks:
These guidelines are applicable to Grade 12 in Agricultural Technology.
Specifications
One paper
Grade 12
Trial Examinations
Duration: 3 hours
Marks: 200
• All the questions must be answered. • Sketches must be neat. • All calculations and units must be indicated. • The questions will not necessarily count for the same marks, as each section of the work has a different weighting.

3. ELABORATION OF THE CONTENT FOR GRADE 12 (*CAPS*)

The final examination in Agricultural Technology Grade 12 will cover the knowledge and skills outlined below.

Safety	Safety hazards: three steps of a hazard control system OHS Act: farm safety regulations according to the OHS Act for: • Hazards associated with the farm environment • Tractor safety • Noise pollution • Basic general safety regulations
Structural materials	Metal alloys Synthetic materials Electric fences
Energy	Alternative energy: • Wind energy • Solar energy • Geothermal energy • Bio-energy
Construction processes	Advanced welding techniques: • CO_2 welding • Advanced welding joints and their applications • Oxy-acetylene cutting • Plasma cutting
Tools and equipment	Harvesting or processing machines/equipment: Tractor systems • Tractor hydraulic systems • Three-point coupling of a tractor • Mass displacement and pulling force of a tractor • Drive systems • Components of the drive system of a vehicle • Pneumatic and hydraulic tools: identification and functions • Economics associated with tractors, equipment and tools
Irrigation and water supply	Overhead irrigation systems (macro irrigation systems): • Irrigation scheduling • Water measuring techniques and devices used in conjunction with effective water scheduling Waste water removal: • Drainage systems used to get rid of access water around farm buildings. Water purification/softening

Communication	Computer control programs: • Irrigation control systems • Computers controlling and monitoring engines, implements and equipment • Computer technology information • Global positioning systems (GPS) • Geographical Information Systems (GIS) • Variable-rate technology (VRT) • Remote sensing Different types of communication systems Sources for knowledge, skills and information Exhibitions, seminars, agricultural unions, discussion groups
Drawings	Freehand design drawings of structures, buildings or implements Introduce and familiarise learners with basic software programs for designing buildings, structures or machine parts
Measurements, calculations and calibrations	Problem solving in data collected: • Use data, collected from measurements and cost calculations in purpose-made fabrications • Effective use of tools, equipment and implements due to correct measurements, calibrations and adjustments

4. GENERAL INFORMATION

4.1 Quantities, symbols and units

The most common quantities, symbols and SI units used in introductory physics are listed below.

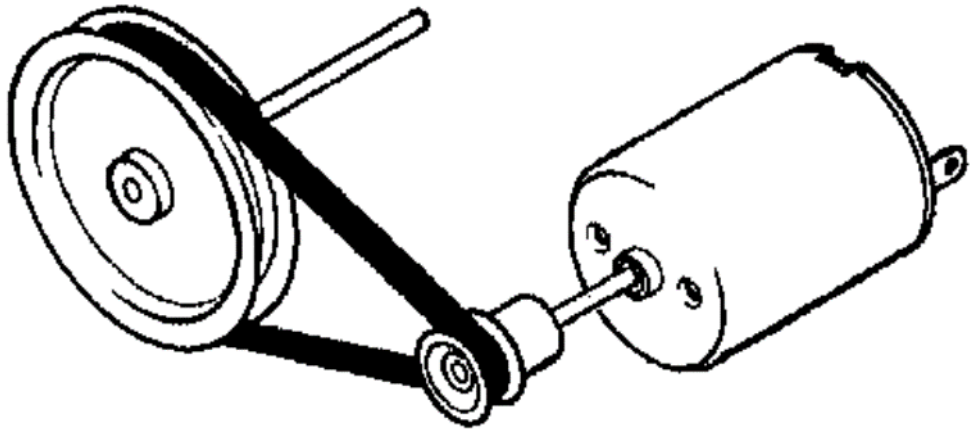
A quantity should not be confused with the unit in which it is measured.

4.1.1 Formulae

- **Determining the speed of a pulley**
  Na X Da = Ng X Dg
  Na = speed of drive pulley
  Da = diameter of drive pulley
  Ng = speed of driven pulley
  Dg = diameter of driven pulley

  Example:

  The sketch below shows an electric motor connected to a pulley with a fan belt. The pulley diameter on the electric motor is 70 mm and the turning speed is 4 000 revolutions per minute. The pump that is connected to the driven pulley requires a speed of 2 000 revolutions per minute.
  Calculate the diameter of the driven pulley by using the formula below. Show ALL calculations.
  $N_a \times D_a = N_g \times D_g$
  Where:
  N_a = Speed of driving pulley
  D_a = Diameter of driving pulley
  N_g = Speed of driven pulley
  D_g = Diameter of driven pulley



$N_a \times D_a = N_g \times D_g$
$4\,000 \times 70 = 2\,000 \times D_g$✓
$D_g = \frac{4\,000 \times 70}{2\,000}$✓✓
Driven pulley diameter $D_g = 140$✓mm✓ (5 marks)

- **Determining speed ratios of pulleys**

  Ratio = $\frac{\text{Drive gear}}{\text{Driven gear}}$

  Example:

  Calculation of the gear ratio if the large drive gear has 54 teeth and the small driven gear has 18 teeth. (Show all calculations.)

  Gear Ratio = $\frac{\text{Drive gear}}{\text{Driven gear}}$
  = $\frac{54}{18}$ ✓✓
  The gear ratio is 1:3✓ (3 marks)

- **Calculate the flow rate in a water system**

  Flow rate = $\frac{\text{Content}}{\text{Time}}$

  Example

  Calculation of the flow rate (litres per minute) by using the data below:
  (Show all calculations)
  The capacity of the tank is 20 k ℓ
  It took 40 minutes to fill the tank to the top.

  Flow rate = $\frac{\text{capacity}}{\text{Time}}$
  = $\frac{20 \times 1000}{40}$ ✓
  = $\frac{20000}{40}$ ✓
  = 500✓ ℓ/minute✓ (4 marks)

4.1.2 Units and their symbols

Metals

- Copper Cu
- Tin Sn
- Zinc Zn
- Brass Cu Zn
- Bronze Cu Sn

Synthetic materials

- Glass fibre
- Vesconite
- Teflon

4.2 Recommended resources

Approved textbooks

Grade 10
Notes from the Department of Basic Education

Grade 11
Notes from the Department of Basic Education

Grade 12
Notes from the Department of Basic Education

4. CONCLUSION

It is envisaged that this Examination Guidelines document will serve as an instrument to strengthen and empower teachers to set valid and reliable assessment items in all their classroom activities.

This Examination Guidelines document is meant to articulate the assessment aspirations espoused in the CAPS document. It is therefore not a substitute for the CAPS document which teachers should teach to.

Qualitative curriculum coverage as enunciated in the CAPS cannot be over-emphasised.